



EOS3.1 A case of the lower secondary science teacher training course for improving knowledge about classification of igneous rocks

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1. Introduction

In Japan, lower secondary school students study classification of **igneous rocks** related to geomorphology of volcanoes in science classes.

		primary school		lower secondary school			upper secondary school
		5th grade	6th grade	7th grade	8th grade	9th grade	10th~12th grade
Earth science	solid earth	Function of running water Erosion Transportation Deposition	Construction of land Strata Fossil Volcanic eruption	Volcanic activity Igneous rock Earthquake Geology Sedimentary rock			Solid earth Geology Geohistory Seismology
	meteorology	clouds atmosphere weather			Weather observation Change of weather Japanese weather		Aerology Oceanology Meteorology
	Astronomy		Moon Sun			Diurnal motion The earth's rotation Annual motion Revolution Solar system Star & planet Galaxy	Space science Planet earth astronomy

Most of lower secondary school science teachers **are not good at teaching about this field**. It might be due to **their poor study experiences** in earth science.

They studied basic geology only in elementary and lower secondary school science classes because upper secondary school science curriculum have not been covered all fields of science.

Consequently, many science teachers prefer to show photographs of rock samples to their students and are apt to avoid instruction of observing rock for identification.

This may cause **disadvantage for their students** to construct the knowledge about plutonism and volcanism.

2. Preparation



Igneous rock specimens



Loupe

Volcanic rocks
rhyolite
andesite
basalt

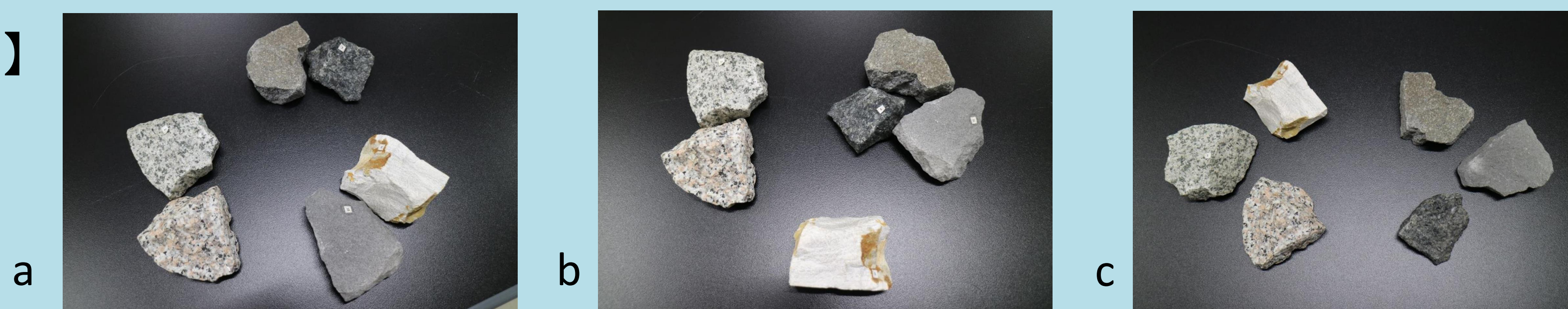
Plutonic rocks
granite
diorite
gabbro

3. Methods & Experiment

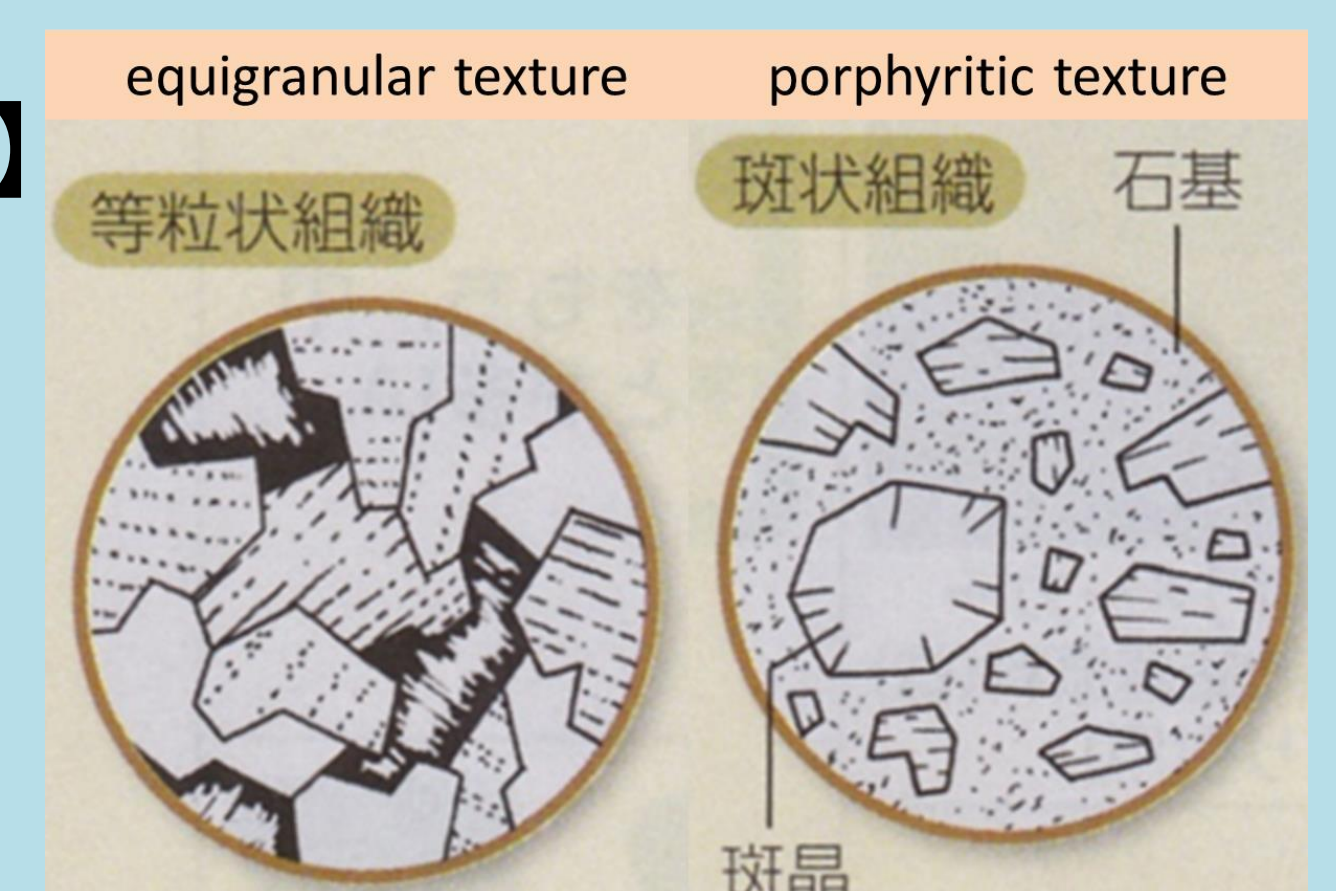
★To improve instructional **methods of basic petrology of igneous rocks**, one of us conducted teacher training courses for lower secondary school science teachers.

- An instructor showed three volcanic rocks (**rhyolite, andesite, basalt**) and three plutonic rocks (**granite, diorite, and gabbro**) to the trainees **with no label**. The trainees tried to classify the samples into some groups based **on any points of views** and present the results to others. 【Fig. 1】
At this time, it does **not matter** whether the classified viewpoint is petrologically correct.

【Fig. 1】



【Fig. 2】

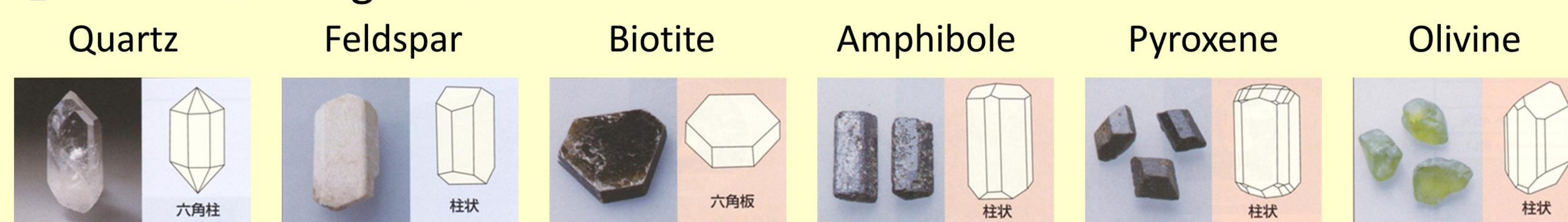


- An instructor explain "equigranular texture" or "porphyritic texture". 【Fig. 2】
Use a loupe **to classify petrologically (equigranular texture or porphyritic texture) into two groups**.
(1 group is designated as 3 each)

- Sort the stones in the two groups **from white to black**.【Fig.3】

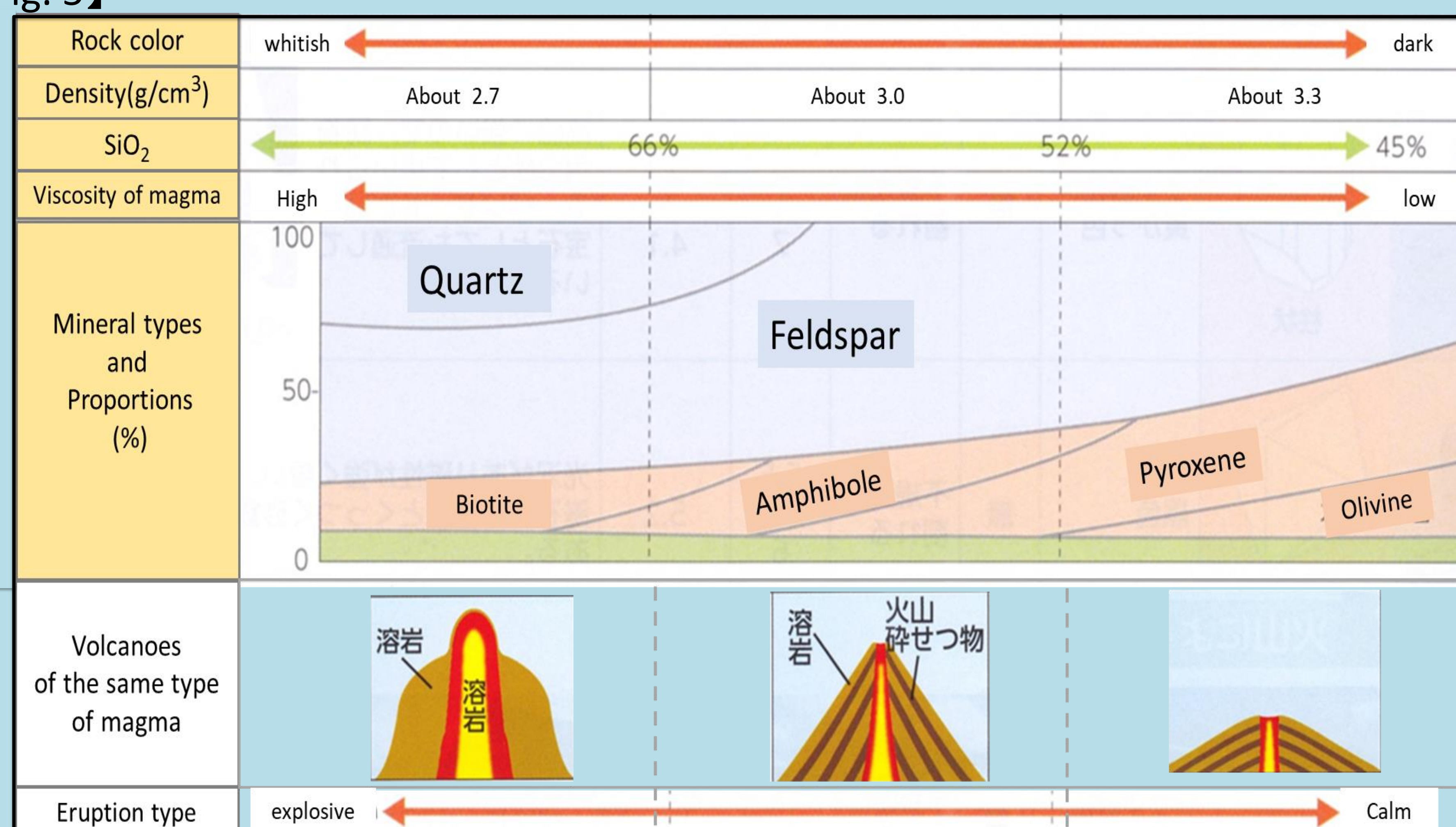
- Observe equigranular texture with a loupe and confirm that there are differences in the constituent minerals.【Fig.4】

【Fig.4】 Rock-forming minerals



- An instructor explain about relations between diversity and chemical components of magma.【Fig.5】

【Fig. 5】



4. Results & Discussion

Questionnaire survey

Many trainees answered, "I really understand the difference between stones." "I didn't know what to teach, but now I know." "I feel more confident in teaching." "I feel that my teaching skills in this area have improved."

I feel definitely that they have improved their skills in teaching in this field.

Discussion

Teacher's lack of skill disadvantages students. It is necessary to conduct **training for teachers**.

We have to conduct more study on **teaching methods** in this field.



It is also necessary to study teaching methods on how to separate sedimentary rocks, metamorphic rocks, and other stones.